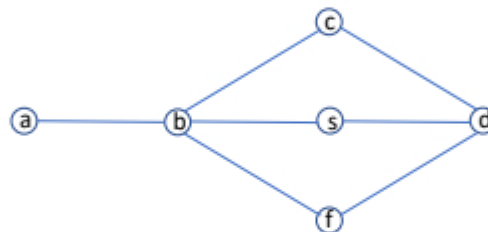


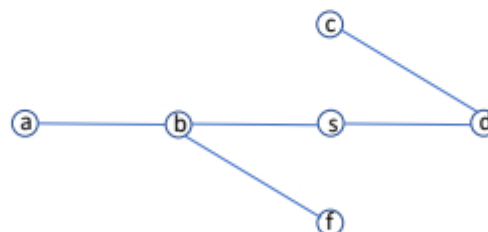
**Instructions:** This quiz is open book and open note, but **not** open-internet. You **may** post clarification questions to Piazza, with the understanding that you may not receive an answer in time and posting does count towards your 30 minutes. Questions posted to Piazza **must be posted as PRIVATE QUESTIONS**. Other use of the internet, including searching for answers or posting to sites like Chegg, is strictly prohibited. Any violation of the honor code is grounds to receive a 0 on this quiz. Proofs should be written in **complete sentences**. **Show and justify all work to receive full credit.**

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**Standard 14.** Consider the following graph with the source node  $s$ :



Is it possible to obtain the following tree using BFS? Clearly justify your answer.



**Solution:** This tree cannot be obtained using BFS with  $s$  as the root node. We note that the next vertices considered are  $b$  and  $d$ . If the algorithm considers  $b$  first, then the edges  $(b, c)$  and  $(b, f)$  are included in the tree. If instead the algorithm considers  $d$  first, then  $(d, c)$  and  $(d, f)$  are included in the tree. In both cases,  $(b, f)$  and  $(d, c)$  are not both included in the tree. So the above tree is not obtainable via BFS.